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EXAMINER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Dear Mr BARFIELD,
Enclosed the latest version
with modifications.

Thanks for your attention

Regards

Yeh

Yann Guehria

APPLICATION N° 10/572,864

Applicant: Yann GUEHRIA

Examiner: Anthony D. Barfield

Art Unit : 3636

Re: Following your notice dated 02/11/2008, new draft including modifications in Description, Claims, Abstract and Drawings.

DESCRIPTION of the INVENTION

System of seat with adjustable suspended<< base>> flexible fabric as seat with slope balanced by the only weight of the body being able with to lift the user to standing position and reverse.

The present invention relates to a system of seat with suspended base ergonomic and releasing, adjustable, with complete and made safe variable slope, balanced by the only weight of the body without mechanism or notch.

Certain systems of seat allow a variable slope but authorize only one partial physical relieving of the body, not supporting it in its entirety from the head to the feet or presenting a non-ergonomic rigid base. Of other systems of seat present a flexible base but do not have any adjustment length of this base nor of the position of the head-rest, being able to adapt precisely to various morphologies of the users. Some other systems of seat allow a variable slope but authorize only one partial or limited slope, allowing either only the slope of the only file of the seat, or that a maximum slope in a position half lengthened, or that a slope simultaneously involving a variation and a deformation of the form of the base of the seat and thus limited by the friction of the base on the ground.

<<Lastly Other systems of seat with variable slope are conditioned by the obligation for the user to leave or to move its sitting position, or to put use notches or mechanisms additive, electric or different, or to develop a particular effort to incline or rectify the seat. The system according to the present invention as follows supplements and improves the systems of existing seat with variable slope:>>

The present system as described in the drawing 3 is also able to help people standing while seated in the chair and seating in the chair while standing up.

The patent (US patent .N°4,367,894) registered by Manuel, as other patents for folding chair systems, describe a concept of foldable examining chair allowing a variation of the backrest and the seat but constructed from rigid and non ergonomic planar panels, this rigid structure being quite different and less adaptable to ageing users needs(ergonomic and autonomy as compared with the present invention.

<< BREAK INTO LEAF OF REPLACEMENT (REGLE 26) >>

SUMMARY

- 1) **System of base suspended, ergonomic and releasing:**

By the 2 following processes, the system according to the present invention indeed allows an ergonomic support of the whole body of the user, involving a relaxation and a muscular and circulatory relieving whatever the adopted slope.

: 1-a) the 1st process consists of a flexible seat, adapting ergonomically to the shape of the body of the user, suspended on the 2 ends of the carriage of seat and supported on the level of the knees, associated a removable and adjustable head-rest and an integrated footrest. The whole of the body of the user is thus supported in permanence<< of>> from the head to the feet in all the positions permitted by the seat. This suspended flexible base distributes and supports completely the weight of the body and allows a muscular relaxation whatever the selected slope.

1-b) the whole of the body being thus supported permanently, it profits from a << Proceeded>> 2nd joint process of rest-foot interdependent of seat in its variations of slope. The base suspended on the involving and supporting carriage of base jointly and completely the body of the user in all the positions (see proceeded 1-a of support of the body), the body can be inclined in maximum reclining position (see proceeded 3 of tilting slope), the feet then being simultaneously concerned and being supported by the footrest integrated in the carriage of base, allowing the circulatory relaxation of the body of the user.

2) System of adjustment of conformation of seat

By the 2 following processes, the system according to the present invention allows an adjustment of the conformation of sat to adjust it with the morphology of its user

2 -a). The first process allows the shortening or the lengthening of this base according to the size of the user<< allows>>. This process is based on a system of adjustment forwards or towards the back of the bar of fastener of sat in its lower part by points of fastener on the <<carriage of the base>> swivelling basis of the supple seat, the bar of fastener of seat in its higher part fixed as remainder . Also the fabric may rotate upon same bar located at the top of the seat and reach by the back of the seat and the frame a bottom bar parallel to the one described earlier located down on the same lowest part of the swivelling chariot. Front bottom and upper back ways for settling the tension are both available These symmetrical points of fastener make it possible to regulate the length of seat and its tension by the advance or the retreat of<< this>> these bars of fixing. One can thus shorten or lengthen the basis according to the size of the user. When set up in it's most tightened position, the supple seat is stretched up near vertical line in maximum tension and presented directly to the standing user, easing securely his access to the seat .

2-b) the second process allows the repositioning of the head-rest on base according to the size of the user. This process is allowed by the removable and adjustable system of the position in height of this head-rest, by self-adhesive side legs fixing and tightening the cushion on the file part of the carriage of base. One can thus position exactly the head-rest according to the size of the user.

3) System of seat with complete and protected variable slope

the system according to the present invention consists of a basis (see proceeded 1), , rocking and deformable longitudinally and reversibly on a fixed, rigid and non deformable carriage , independently of this basis and without modification of this one, while having a system of stops of safety fixed on the carriage, controlling into obstinate the back rocker.

By the 3 following processes, the system according to the present invention allows a variable, complete and protected slope of base, making it possible to the user to modify the slope of the seat of the sitting position with the reclining position, with all the possible intermediate positions, without risk of inversion in maximum back position.

3-a) the 1st process is based on the constitution of the basis of seat in a deformable centred semi- parallelepiped made up of 2 semi-quadrilaterals joined between them, equilateral deformable and symmetrical in 2 parallel plans centring the structure of the seat, authorizing the free rotation of the unit seat/carriage of seat suspended on the stable and rigid basis:

- This deformable semi-parallelepiped is defined by the meeting of the 3 rigid parts constitutive of the carriage of base, fixed and swivelling between them and on the base, this meeting forming 2 symmetrical equilateral semi-quadrilaterals in the 2 parallel plans, their equilateral shape being defined by the equal distance between the 4 points tops of the 2 quadrilaterals one by one

- These 2 symmetrical equilateral semi-quadrilaterals in 2 parallel plans each one are fixed and swivelling by rotation on the stable basis in 2 fixed points at their 2 higher ends around 2 imaginary <<enter them>> plans parallel with each other and perpendicular to the 2 preceding plans, and fixed and swivelling by rotation in 2 points consisted their 2 lower angles around 2 other axes parallel with the precedents. These 2 equilateral semi-quadrilaterals are thus deformable longitudinally in equilateral rhombuses flattened by rotation around their 4 angles in the 2 preceding parallel plans.

- the parallelepiped thus made up is deformable longitudinally and symmetrically by pivot on the stable basis around its 2 fixed higher axes and its 2 lower axes, these 4 axes being parallel and perpendicular to the 2 parallel plans centring the structure.

3-b) the proceeded 2nd is consisted the interaction by rotation of the preceding parallelepiped on the remainder of the structure of the carriage of seat (back and footrest), whose constitutive part is:

The basis, fixed and swivelling freely on the stable and non deformable carriage, supports the user. Any deformation and lengthening of the structure of basis involve the deformation and the lengthening of seat and thus the variation of slope of the position of the user.

3-c) the 3rd process allows the control of the maximum back variation of the lengthening and the rocker on the whole of the structure carriage of seat: this control is ensured by the existence in butted of 2 stops of safety fixed on the stable and non deformable carriage against which comes to block the deformable set basis in its high part. The same stopper is useful when the swivelling seat frame is in maximum standing position, blocking the frame to move too forward.

. 4) System of chair with slope balanced by the only body weight

:

The system according to the present invention allows a control and a balance of the slope of the structure seat/carriage of seat by the only weight of the body of the user, without extra mechanism or device. This system is allowed by a process of alignment and interaction on the same axis of the weight of the body of the user in the Center <<of the seat>> of the chair and the Center of balance of the carriage of seat.

This process of alignment connects:

- the point of balance of the weight of the user's body in the Center of flexible suspended and fixed seat in its 2 ends and supported and sliding freely on the level of the knees (see proceeded 1), on 3 constitutive bars of the carriage of seat itself fixed and swivelling on a stable and rigid base (see proceeded 3), the whole of the carriage of sited being balanced on:
 -
 - the point of centring of the deformable parallelepiped previously definite (see proceeded 3), located at the intersection of the axes joining its opposite tops and constituting the point of balance of the carriage of seat
 -
 - The two points superimposed above define an axis connecting the point of balance of the weight of the body of the user to that of the carriage of seat. The parallelepiped, basis of the carriage of seat, making up of 2 equilateral quadrilaterals (see proceeded 3), this axis is parallel with the vertical axes of these 2 quadrilaterals and thus with the plan of slope of the whole of the carriage of seat.
 -
 - The unit seat/carriage of sited being interactive and swivelling (see proceeded 3), any transfer of the weight of the body of the user on base implies the reciprocal displacement reversed of the point of centring of the carriage on their axis of alignment and the longitudinal corollary deformation of the parallelepiped and the carriage of sited: the slope of the seat follows the weight of the body.
 -
 - **5. system of chair being able to help people going from standing to seated postures and reverse**
 - **The possible adaptation of the supple seat to the user's mobility and size, thanks to adjustable bars fastening the lower ends of the supple seat hanging on a rotating seating structure, on a stable basis, these adjustable bars allowing to adjust the seat tension and length by moving backwards or forward of it's position. For example when set up in it's most tightened position, the supple seat is stretched near vertical line in maximum tension and presented directly to the standing user, easing securely his access to the chair and conversely easing securely his exit from the chair when sitting. This adjustment system allows moreover a precise adaptation of the seating length to the user size and morphology.**
- **Drawings**
- The description and the setting up of the preceding processes according to the present invention are illustrated in figures 1 , 2 and 3 following: -
 -
 - figure 1 presents the system of this invention in its seated starting configuration, -
 -
 - figure 2 presents the system of this invention in its variation of maximum slope (laying back)
 -
 - **figure 3 : Side view of the chair with the adjustable supple seat stretched near vertical line in it's maximum position, the seat being therefore presented directly to the user while he is standing .By physical laws the distance between T1and T5 becoming shorter the all swivelling part is brought forward and helps the user getting up.This stretching of the seat can be brought by any device located at/or from the parts T2 or T5.this allows the user to be brought from seating to standing and opposite.**
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- << **Description of the system :>>**

- **Operating of the system**

- In reference to these 3 figures, this system comprises 3 large components:

- **1. a flexible seat,**

- Equipped with a head-rest (E) removable and fixed by adjustable side fasteners (L1, L2) (laces, scratch, pressures or another mode of fastener). This base is fixed and/or suspended on the carriage of seat:

- - in its 2 ends out of 2 bars (T2, T5), so as to slide freely in rotation (brackets or another mode of fixing), T5 being fixed and removable T2 to allow the fixing and the adjustment length of base –

- - on the level of the knees on a fixed bar (T1), so as to slide freely

- - on the level of the ankles on a fixed bar (T3), so as to slide freely

- **2. a carriage of seat composed of 3 parts rigid, fixed and swivelling between them (B1, B2, B3), jointly constituting the executives of the file and base, and organizing themselves as follows:**

- - B1: a semi rigid parallelogram at 3 sides out of U, supporting base on its higher side (T5), fixed and swivelling at its 2 lower ends by 2 symmetrical points of rotation (4), <<equipped with joints antifriction metal,>> following an axis (X4), on 2 parallel levels between them perpendicular to this axis, to:

- - B2: a rigid parallelogram at 4 sides, formant footrest integrated (R) on its front side, equipped with the 2 transverse bars allowing sliding motion (T3) and fixing and the adjustment in length (T2) with base, B2 being fixed and swivelling in 2 symmetrical points of rotation (3), equipped with joints antifriction metal, following an axis (X3) parallel in X4, on same the 2 preceding parallel levels on:

- - B3: a semi rigid parallelogram at 3 sides, its side higher being shifted at its 2 ends towards the interior of the parallelogram to constitute a bar fixes transverse (T1) supporting base at the level of the knees of the armchair user and allowing the free

- sliding motion of this one in the rocker. Rotary B1, B2 and B3 being assembled and between them such as above, the structure of the carriage of seat thus made up is suspended and fixed on a stable basis in the last 4 symmetrical points of rotation 2 by 2 (1 and 2), << equipped with joints antifriction metal>>, along the 2 parallel axes between them (X1 and X2), themselves parallel in X3 and X4. Are thus defined 2 symmetrical equilateral quadrilaterals (P1/P2) in 2 deformable parallel plans in rhombuses flattened around their 4 angles and forming between them a deformable parallelepiped symmetrically between the definite preceding plans parallel around items 1, 2, 3 and 4, by rotation on:

- **3. a stable and rigid base (C) resting on the ground, made up of non deformable symmetrical elements forming mounting and balustrades (F), integral of the stops of safety (S) controlling into obstinate the rocker of sat in back position. Constants and constraints to be respected in the application of this system so that it functions, and this independently of the form of this structure, are:**

- a) an equidistance between the points of rotation 1, 2, 3 and 4, thus constituting 2 symmetrical equilateral quadrilaterals (P1/P2) in 2 deformable parallel plans in rhombuses, independently of the distance separating the 2 quadrilaterals and thus the 2 plans. The deformable parallelepiped consisted P1/P2, fixed and rotary on a non deformable basis, is balanced in its rotation around its Center located in (G'), intersection of the axes joining the opposite tops of the parallelepiped. This Center constitutes with the Center of balance of the weight of the body (G) of the user an axis parallel with the vertical axes of the 2 quadrilaterals.

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- b) a distance of the axes X1 and X2 on the ground higher than the height of 2 quadrilaterals P1/P2 (items 1 - 3 and 2 - 4), to allow the suspension of the carriage of seat on the basis authorizing the free rocker of the carriage around G without friction on the ground. This system of seat with suspended base ergonomic and releasing, adjustable, with complete and made safe variable slope balanced by the weight of the body can be declined: - in all usual materials of the sector of furnishing (metal, wood, composite or different matters) and in varied forms of structure (round, angular,...), thus not being subjected to phenomena of mode - bound for all the economic sectors requiring of furniture practical and comfortable (thalassotherapy, hotel facilities, decoration, garden-Center, elderly people homes
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- on figures 1/2 and 2/2, the various processes and interactions are realised by the only user sitting in the seat as follows:
 - a) The user transfers slightly forwards or backwards his weight from the body (G) supported by base (A) to obtain the new wished position, without any development of effort.
 -
 - b) This transfer of the weight of the body of the user (G) modifies the position of the secondary axis connecting it to the Center of the parallelepiped (G') involving simultaneously:
 - a symmetrical longitudinal deflection of the parallelepiped made possible specifically by its constitution in 2 symmetrical equilateral quadrilaterals in 2 parallel plans (P1, P2) them-even deformable in flattened rhombuses, defined each side by joining their points of rotation 1 - 2 - 3 and 4, which swivel by rotation on the stable basis around the 2 axes (X1, X2), like around 2 other parallel axes of rotation (X3, X4). These 4 axes correspond to the swing angles of the quadrilaterals (1, 2, 3, 4).
 -
 - a free sliding motion of the seat (A), fixed and swivelling (T5, T2) on the carriage of base balanced and suspended (B1, B2, B3) which swivels (X1, X2) on a basis stable and rigid (C), and sliding freely on the level of the knees on bar (T1) and on the level of ankles (T3) the capital stock transfer on basis involves the capital stock transfer of the carriage in the new position of balance. The carriage of base thus<< undergoes >> drives by rotation around its Center and on its axes a double movement controlled by the weight of the body of longitudinal rocker and lengthening (or rectification) in the direction of the displacement of weight<< printed >> initiated by the user. The footrest (R) integrated in the carriage of base naturally follows the lengthening or the rectification of the carriage, supporting the legs in all the positions. The simple transfer of its weight of the body by the user thus involves the controlled dynamic swing of the whole of the system of seat, lengthening or rectifying, partially or completely, the seat according to the desired position. All the positions obtained are stable and do not require any effort to be maintained.
 -
 - Considering fig 2 and 3, the present invention describes an adaptable system of seat to the user' mobility and morphology thanks to the possible adjustment of the tension and length of the supple seat.
 - Adaptation of the seat to user's mobility, easing the user's access in the armchair and exit from the seat by adjustment of the flexible seat tension: this process is based on the suppleness of the seat(A), hanging as a hammock on its 2 ends on bars (T2,T5) of the seating structure(B1,B2,B3) as intermediate supports for user's knees and ankles. As shown on Fig 3, the maximal backwards retreat of the adjustable bar T2 on maximum rear fastening point on the seating structure pulls backwards the supple seat(a) on its lowest end, the occurred stretching of the seat, fixed on its lowest end on bar T5, pulls the upper end of the seat on T5 and bends

over the deformable seating structure rotating freely on the stable base(C) along axis (X1,X2).

- The supple seat, stretched on seating structure itself bended forward on the stable base, is presented near vertical line to the user standing in front of the chair, easing and helping its access or conversely its exit without development or effort or risk of fall when seating or standing for users with reduced mobility.
- On fig 3 the tension of the supple seating brought by a force in traction on the fabric pulled back behind the bars T5(from the top at the back of the seat) or T2(to the bottom rear movement of the bar T2 .)
- This strength initiated by only one (physical, mechanical , electric actuator, hydraulic etc...)device brings tension to the supple seating initiated behind the bars(T5, T1, T3, T2 and T4) and can bring the person from laying to seating and standing ,because the distance between the bars T1 and T5 gets shorter the supple seat being stretched up near vertical and there is no more room left for seating. Thru tension the movement of the swivelling structure has to go forward and bring the person 's gravity Center to vertical (standing) position. The Center of gravity of the user G moves then forward along with the stretched almost vertical supple seating and away from the Center of gravity of the seat G' located between the 4 sustaining points located on the carriage C .The user is out of the seat and is brought to standing position.
- This necessary strength can be brought by any device put in action almost anywhere on the swivelling structure .(all bars T, are available and it is possible also to use the bars B as axial lines of the movement).
- Moving along jointly with the parallelogram. The tension creates the forward movement .The reverse (release of the tension of the supple fabric of the seat) will move the person backwards from standing towards seating and laid back position.
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CLAIMS

- Having described the invention with sufficient clarity to enable those skilled in the art to make and use it, what is claimed as inventive, new and desired to be secured by US patent is:
- **1.currently amended** A system of armchair with an ergonomic adjustable supple suspended seat with a secured controlled and balanced inclination by body weight only composed of:
- a stable and rigid base resting on the ground, supporting the whole seating structure, constituted by non deformable symmetrical elements forming mounting and balustrades, integrating 2 rocking safety stops,
- a deformable balanced seating structure suspended and rocking on this base, composed by 3 main parts, articulated and rotating between them and constituting a longitudinally deformable parralleliped balanced on the intersection point of its tops,
- an adjustable and ergonomic supple seat, suspended and fastened like a hammock of this seating structure and centred on the body weight point of user,
- wherein the whole body of the user is ergonomically distributed and held from head to knees allowing relaxation and avoiding stiffening risks whatever chosen position, centred on the user' body weight in the supple seat.

- **2 .New.** a system of armchair with an ergonomic adjustable centred suspended seat, according to Claim 1, including a one in piece supple seat material without planar panels or angles from head to knees:
- adaptable to user's mobility and morphology thanks to the adjustment bar of the seating structure stretching or releasing the seat length and tension following the user's mobility in maximum, intermediate or minimum position and easing his access and exit from the chair and thanks to the structure of the chair where the bars T and B1 can be used as main guidances for physical help pulling devices being able and needed to bring the user from laying to standing position, and reverse,.
- **3. currently amended.** A system of chair with an ergonomic adjustable centred suspended and supple seat with a secured controlled and balanced inclination by bodyweight only, according to Claims 1 and 2, including a deformable seating structure rocking on the base around its balance point allowing:
- the controlled rocking of the seat by the user's body weight backwards and forward at user's choice thanks to the alignment axis between the user's bodyweight point and the balance point of the seating structure,
- the independence of this rocking for the user, thanks to the natural control of the slope by his bodyweight interaction to reach and keep all positions without help or effort
- the secured rocking backward and forward for the user, thanks to the security stops fixed on the base forbidding falls in maximum backward or forward rocking.

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- **ABSTRACT**

- An ergonomic chair system constructed from a stable base holding a rocking balanced seating structure, provided with an adjustable suspended relaxing supple seat, allowing an independent balanced controlled and secured inclination, by bodyweight only without help, effort or locking device .This system is specially intended for the use of ergonomic chairs and particularly well adapted to users with reduced mobility thanks to its ergonomic seat, its autonomous use and the possible secured accompanying in the chair from and to the standing position for users. The chair system is realizable in all usual furniture materials.

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